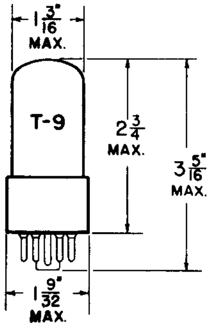
TUNG-SOL

TWIN TRIODE

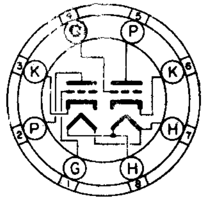


GLASS BULB

COATED UNIPOTENTIAL CATHODE

HEATER
6.3 VOLTS 0.3 AMP.
AC OR DC

ANY MOUNTING POSITION



BOTTOM VIEW
INTERMEDIATE SHELL
8 PIN OCTAL
LOW LOSS PHENOLIC

8BD

THE 6188/6SU7WGT IS A RUGGEDIZED, HIGH MU, TWIN TRIODE IN THE OCTAL BASE, BANTAM CONSTRUCTION. THE TWO TRIODES ARE ELECTRICALLY INDEPENDENT, ALLOWING SIMULTANEOUS USE OF THE TWO IN COMPLETELY DIFFERENT APPLICATIONS. TIGHT GAS AND LEAKAGE CONTROLS ON THE TUBE INCREASE STABILITY AND A SPECIAL PLATE CURRENT BALANCE TEST BETWEEN SECTIONS IS SPECIFIED. THEREFORE, IN ADDITION TO GENERAL PURPOSE APPLICATIONS SUCH AS VOLTAGE AMPLIFIERS, OSCILLATORS AND MULTIVIBRATORS, THE 6188/6SU7WGT MAY BE USED IN APPLICATIONS REQUIRING EXTREME STABILITY SUCH AS BALANCED AMPLIFIERS, AND WHERE LARGE GRID RESISTORS MAY BE NECESSARY. CONTROLS ON THE PRODUCT AVERAGE FOR SUCH CHARACTERISTICS AS PLATE CURRENT, TRANSCONDUCTANCE AND AMPLIFICATION FACTOR ASSURE THAT THESE CRITICAL CHARACTERISTICS WILL REMAIN WELL CENTERED. SINCE IT MUST BE ABLE TO WITHSTAND SEVERE MECHANICAL TESTS TO MEET TEST SPECIFICATION, THE 6188/6SU7WGT IS ESPECIALLY SUITED FOR USE IN MILITARY AND INDUSTRIAL AIRBORNE EQUIPMENT WHICH MAY BE SUBJECTED TO SEVERE SHOCK AND VIBRATION.

RATINGS

ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE	6.3±0.6	VOLTS
MAXIMUM DC PLATE VOLTAGE	275	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	±100	VOLTS
MAXIMUM PLATE DISSIPATION (EACH SECTION)	1.1	WATTS
MAXIMUM BULB TEMPERATURE	+165	°C

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

CLASS A_1 AMPLIFIER (EACH SECTION)

PLATE VOLTAGE	250	VOLTS
GRID VOLTAGE	-2	VOLTS
PLATE CURRENT	2.3	mA
PLATE RESISTANCE	44 000	OHMS
TRANSCONDUCTANCE	1 600	μMHOS
AMPLIFICATION FACTOR	70	

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TUNG-SOL

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CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

E_f = 6.3V, E_b = 250 Vdc, E_c = −2.0 Vdc
EXCEPT AS MODIFIED BELOW

	INITIAL INDIVIDUAL MIN.	INITIAL INDIVIDUAL MAX.	PROD. MIN.	AVG. MAX.	500 HOUR LIFE TEST INDIVIDUAL MIN.	500 HOUR LIFE TEST INDIVIDUAL MAX.	
HEATER CURRENT	275	325	---	---	275	325	mA
HEATER CATHODE LEAKAGE (E_{hk}=±100Vdc)	---	5.0	---	---	---	5.0	µAdc
GRID CURRENT (1)[A]	0	−0.5	---	---	0	−0.5	µAdc
PLATE CURRENT (1)	1.55	3.05	2.00	2.60	---	---	mAdc
AC AMPLIFICATION[BP] (E_{bb}=200Vdc, E_c=0, E_{sig}=0.2Vac, R_g 2000)	8.6	---	---	---	---	---	Vac
PLATE CURRENT (2) (E_c =4.50Vdc)	---	200	---	---	---	---	µAdc
PLATE CURRENT (3) (E_c =4.25 dc)	5	---	---	---	---	---	µAdc
INSULATION OF ELECTRODES[C] R(g-all)	100	---	---	---	---	50	MEGOHM
R(p-all)	100	---	---	---	---	50	MEGOHM
TRANSCONDUCTANCE (1)	1325	1875	1500	1700	---	---	µMHOS
Δ TRANSCONDUCTANDE[D] (E_f = 5.7V)	---	15	---	---	---	---	PERCENT
AMPLIFICATION FACTOR[E]	55	85	62	78	---	---	
PLATE CURRENT DIFFERENCE[F]	---	±0.1	---	---	---	---	Vdc
GRID CURRENT DIFFERENCE[F]	---	±1.5	---	---	---	---	Vdc

SPECIAL REQUIREMENTS

	MIN.	MAX.	
NOISE AND MICROPHONICS[AG] (E_f=6.3Vac, E_{hk}=0, E_b=200Vdc, E_c=0, R_L=0.1 meg.)	---	50	mVac
LOW PRESSURE VOLTAGE BREAKDOWN[H] (PRESSURE = 55±5mm Hg., voltage=500Vac)	---	---	
LOW FREQUENCY VIBRATION[JA] (R_{p_K} = 10,000)	---	50	mVac
SHOCK[K] (HAMMER ANGLE = 30°C, E_{hk}=+100Vdc	---	---	
VIBRATIONAL FATIGUE[L]	---	---	
POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS			
VIBRATION	---	200	mVac
HEATER CATHODE LEAKAGE (E_{hk}=±100 Vdc)	---	±10	µAdc
GRID CURRENT (1)	0	−0.5	µAdc
AC AMPLIFICATION	8.0	---	Vac
1 HOUR STABILITY LIFE TEST (E_b=250Vdc, E_c=1.0Vdc, E_{hk}=±100Vdc, R_g=1.0meg; TA=Room)	---	---	
STABILITY LIFE TEST END POINTS Δ TRANSCONDUCTANCE (1) OF INDIVIDUAL TUBES	---	10	PERCENT
INTERMITTENT LIFE TEST[N] (STABILITY LIFE TEST CONDITIONS OR EQUIVALENT ENVELOPE TEMPERATURE =+165°C)			

NOTES

[A] TIE 1p TO 2p, 1g TO 2g, 1k TO 2k. (PARASITIC SUPPRESSOR OF 50 OHM MAXIMUM PERMITTED).

[B] SEE MIL-E-1C 4.10.11.2

[C] SEE MIL-E-1C 4.8.2

[D] THE VALUE OF Δ TRANSCONDUCTANCE SHALL APPLY TO INDIVIDUAL TUBES AND IS EXPRESSED:

$$\frac{(\text{SM AT } 6.3)-(\text{SM AT } 5.7)}{(\text{SM AT } 6.3)} \times 100$$

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TUNG-SOL

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NOTES — CONT'D.

[E] SEE MIL-E-1C 4.10.11.1

[F] THE TEST CIRCUIT TO BE USED IS SHOWN SCHEMATICALLY IN FIGURE 1. WITH SWITCH S1 IN POSITION (1) ADJUST Ec ON SECTION 2 TO GIVE E = 0 ON METER M1. MEASURE Ec AT METER M2.

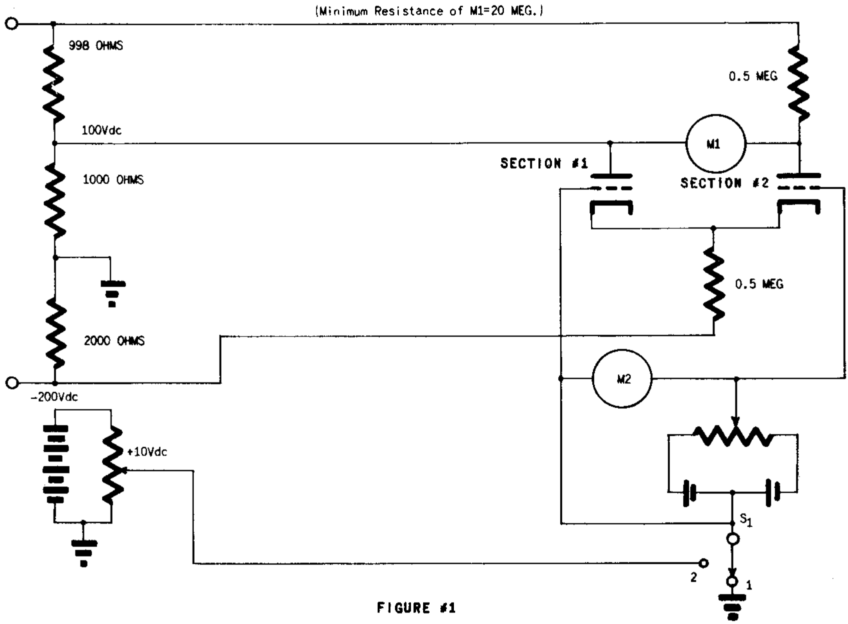


FIGURE #1

[G] SEE MIL-E-1C 4.10.3.5

[H] BREAKDOWN IS DEFINED AS THE VOLTAGE AT WHICH ARCING OCCURS BETWEEN ANODE BASE PIN AND ADJACENT PINS. TEMP.= $25 \pm 5^\circ$C, HUMIDITY=0; VOLTAGE SHALL BE OF SINUSOIDAL WAVEFORM AT F=60 CPS. PRESSURE =55±5mm Hg.

[J] SEE MIL-E-1C 4.9.19.1

[K] SEE MIL-E-1C 4.9.20.5

[L] SEE MIL-E-1C 4.9.20.6

[N] ENVELOPE TEMPERATURE IS DEFINED AS THE HIGHEST TEMPERATURE INDICATED WHEN USING A THERMOCOUPLE OF .003 IN. MAX. DIAMETER ELEMENTS WELDED TO A RING OF .025 IN. DIAMETER PHOSPHOR BRONZE PLACED AROUND THE BULB.

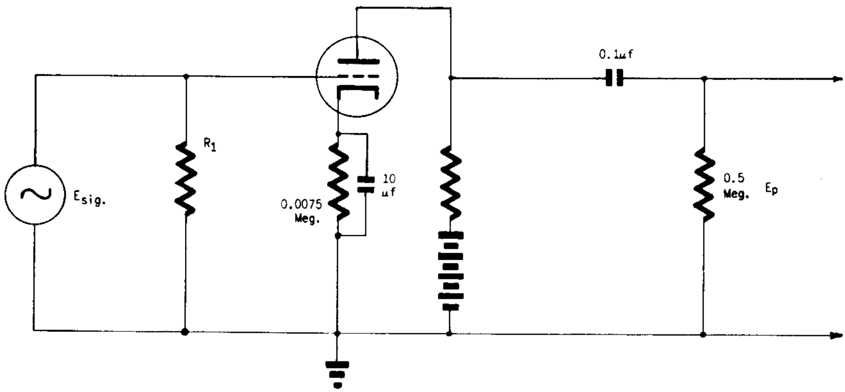
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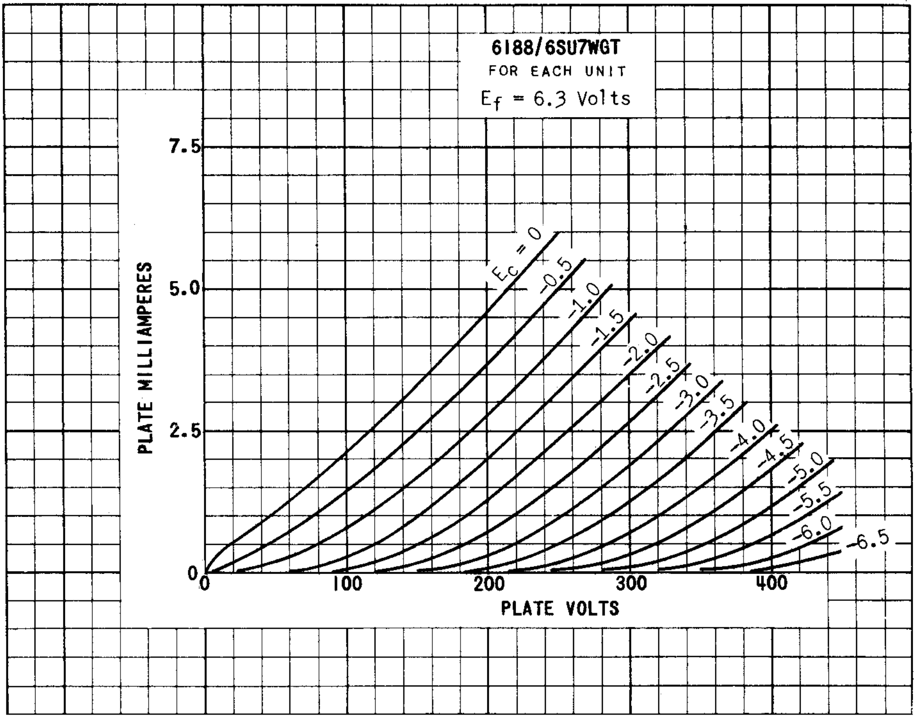
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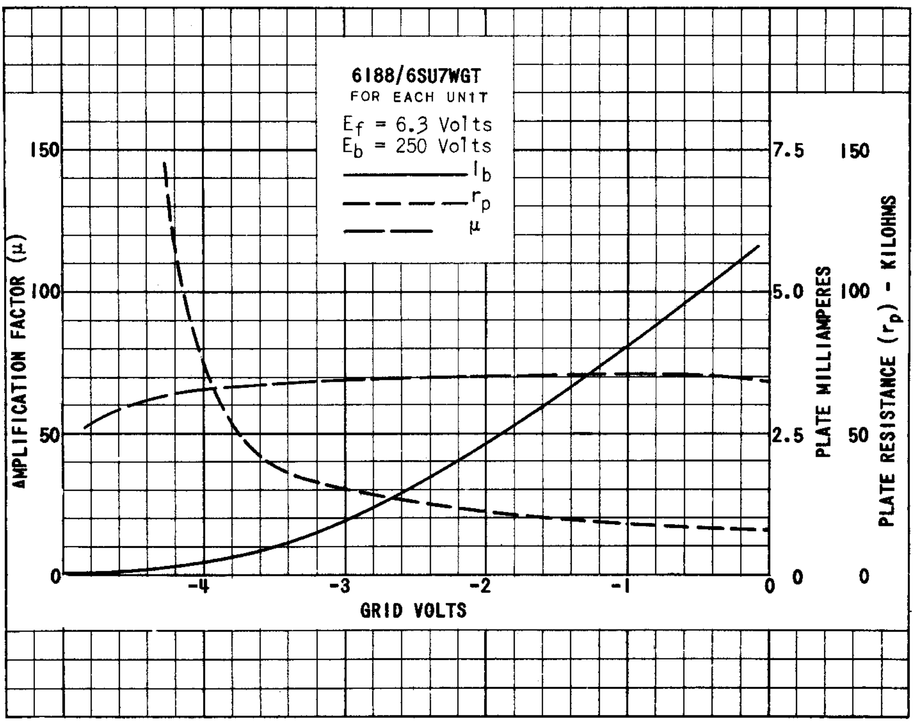
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P Esig = SIGNAL GENERATOR WITH INTERNAL RESISTANCE SUCH THAT IN COMBINATION WITH R_1 GIVES 2000 OHMS RESISTANCE BETWEEN #1 GRID AND GROUND.




6188/6SU7WGT
FOR EACH UNIT
Ef = 6.3 Volts
PLATE MILLIAMPERES
7.5
5.0
2.5
0
Ec = 0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0
-3.5
-4.0
-4.5
-5.0
-5.5
-6.0
-6.5
0
100
200
300
400
PLATE VOLTS


6188/6SU7WGT
FOR EACH UNIT
Ef = 6.3 Volts
Eb = 250 Volts
Ib
rp
μ
AMPLIFICATION FACTOR (μ)
150
100
50
0
-4
-3
-2
-1
0
GRID VOLTS
7.5
5.0
2.5
0
PLATE MILLIAMPERES
150
100
50
0
PLATE RESISTANCE (rp) - KILOHMS